IN THE CLAIMS

The claim listing is repeated here as a courtesy for the examiner.

Claims 1 to 27 (canceled).

Claim 28 (previously presented): A wave field microscope comprising:

an illumination system for illuminating an object for examination with a plurality of coherent light beams through at least one objective lens arrangement, the object having a plurality of object structures, the light beams interfering in at least one object plane and illuminating the object in the object plane with an interference pattern;

an optical detection system; and

a holding device for the object,

the interference pattern being a two- or three dimensional point pattern generated by two or three standing wave fields,

the object being shiftable relative to the point pattern, each object structure causing a modulation of the light detected by the optical detection system within a detection point spread function, the modulation being given by the point spread function of the wave field microscope through convolution of the point pattern and the detection point spread function,

for each object structure, a maximum of the point spread function of the wave field microscope being detectable within the detection point spread function using intensity measurements,

a space between two object structures being detectable as a function of values of the maximums of the point spread function of the wave field microscope for the two object structures so as to permit the wave field microscope to measure geometric distances between the object structures.

Claim 29 (previously presented): The wave field microscope as recited in claim 28 wherein the optical detection system detects fluorescent light.

Claim 30 (previously presented): The wave field microscope as recited in claim 28 wherein the interfering light beams are adjustable to be aligned antiparallel or at a variable angle to one another.

Claim 31 (previously presented): The wave field microscope as recited in claim 28 wherein the lens arrangement has at least two spatial directions, the lens arrangement having in at least one of the spatial directions a first objective lens with a first numerical aperture or a first reflector assigned to a second objective lens with a second numerical aperture higher than the first numerical aperture, and, in at least one of the other spatial directions, the lens arrangement has two other objective lenses with other numerical apertures lower than the second numerical aperture, or a third objective lens with a third numerical aperture lower than the second numerical aperture and a second reflector assigned to the third objective lens.

Claim 32 (previously presented): The wave field microscope as recited in claim 28 wherein the illumination system includes at least one first illumination source for the light beams capable of coherence and at least one beam splitter for decoupling at least one of the light beams, the lens arrangement including a common lens assigned to both the first illumination source and the at least one beam splitter, the light beams and beam splitter capable of being coupled to said common lens so that on a rear focal plane facing away from an object space, the light beams produce two spaced apart focal points, and that in a further space between the rear focal plane and a further focal plane in the object space the light beams run in a variably-adjustable angle to one another and interfere to create a standing wave field.

Claim 33 (previously presented): The wave field microscope as recited in claim 32 wherein the illumination system further comprises at least one additional coherent light beam, and the lens arrangement includes a further objective lens being assigned to additional coherent light beam, the further objective lens capable of directing and aligning the additional coherent light beam in the object space so that the additional coherent light beam interferes with the standing wave field produced by the light beams so as to generate the point pattern.

Claim 34 (previously presented): The wave field microscope as recited in claim 28 wherein the detection system comprises at least one detection objective lens similar to an objective lens of the objective lens arrangement.

Claim 35 (previously presented): The wave field microscope as recited in claim 28 wherein the holding device is arranged in the wave fields and is capable of being rotationally mounted about an axis.

Claim 36 (previously presented): The wave field microscope as recited in claim 35 wherein the holding device is capable of being rotated 360 degrees about the axis.

Claim 37 (previously presented): The wave field microscope as recited in claim 28 point pattern is capable of being rotated about an axis.

Claim 38 (previously presented): The wave field microscope as recited in claim 28 wherein the holding device or and/or the point-pattern are capable of being rotated about an axis so as to illuminate the object sequentially or simultaneously with the point pattern.

Claim 39 (previously presented): The wave field microscope as recited in claim 28 wherein the detection system includes a scanner reflector arranged so as to be suitable for forming an image of the object structures using the intensity measurements.

Claim 40 (previously presented): The wave field microscope as recited in claim 28 wherein the illumination system includes in at least one first spatial direction a real illumination source for the two- or multi-photon excitation, and in at least one other spatial direction, another illumination source for the two- or multi-photon excitation, and the standing wave fields (WF_1 ,WF_2, ..., WF_i) generated having wavelengths (λ_1, λ_2 ..., λ_i) differing from one another, and having distances (d_1, d_2, ..., d_i) between specific wave maxima or wave minima of $d_1 = \lambda_1/ 2n \cos\theta_1$ or $d_2 = \lambda_2/ 2n \cos\theta_2$ or $d_i = \lambda_i/ 2n \cos\theta_i$ where n equals the index of refraction in an object space and θ_1, θ_2 ,... θ_i equals an intersection angle of the light waves of the wavelengths λ_1, λ_2 ...,λ_i with an optical axis, and with the wave fields WF_1,WF_2 ... W_i being aligned with respect to one another so that at least a maximum of at least two standing wave fields is situated at a same place.